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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,118

08/01/2006

Bernadette Charleux

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ARKEMA INC.

PATENT DEPARTMENT - 26TH FLOOR

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PHILADELPHIA, PA 19103-3222

EXAMINER

FINK, BRIEANN R

ART UNIT

PAPER NUMBER

4131

MAIL DATE

DELIVERY MODE

11/06/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,118	Applicant(s) CHARLEUX ET AL.	
	Examiner BRIANN R. FINK	Art Unit 4131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-28 is/are rejected.
- 7) ☒ Claim(s) 11, 20, and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/01/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's preliminary amendment filed on August 1, 2006 is acknowledged.
Claims 1-10 are canceled.
Claims 11-28 are currently pending and under examination.

Claim Objections

2. Claims 20 and 25 are objected to because of the following informalities:
3. Claim 20, line 1, recites "The process as claimed claim 11..." but should be "The process as claimed in claim 11...". Appropriate correction is required.
4. Claim 25, line 23 recites the polymer " poly(perfluorooctyl acrylate)-b-poly(behenyl acrylate" but should be "poly(perfluorooctyl acrylate)-b-poly(behenyl acrylate)". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 11, 12, 16-18 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11 and 12 recite the phrase "water-soluble alkoxyamine". The applicant defines "water-soluble alkoxyamine" to mean any alkoxyamine of formula (I) or (II), having a solubility in the aqueous phase of at least 1 g/L at 25°C.

MPEP 904.01 states the following:

During patent examination, the claims are given the broadest reasonable interpretation consistent with the specification. See *In re Morris*, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997).

In order to follow the rules of the MPEP, this requires the examiner to interpret claim 11 in consideration to the express definition as claiming a process for the emulsion polymerization carried out in the presence of a molecule having formula (I) or (II); however, this would further render claim 12 as improper, under 35 U.S.C. 112, 4th paragraph, as failing to further limit the subject matter of claim 11. Thus, the claims are indefinite because it is unclear whether the phrase “water-soluble alkoxyamine” is limited to the definition in the specification or may encompass compounds outside the scope of formulae (I) and (II).

Claim 11, line 2 and claim 18, line 3 recite the limitation "the radical route". There is insufficient antecedent basis for this limitation in the claims.

Claim 20, lines 12 and 13 recite the limitation "the emulsion". There is insufficient antecedent basis for this limitation in the claim.

Claim 16, line 2 and claim 17, line 2 recite the limitation "the polymerization medium". There is insufficient antecedent basis for this limitation in the claim.

Claim 20, line 1 recites the limitation “the mixing”. There is insufficient antecedent basis for this limitation in the claim.

Claim 20, line 11 recites the limitation “the polymerization temperature”. There is insufficient antecedent basis for this limitation in the claim.

Claim Interpretation

7. For the purposes of examination, the phrase “water-soluble alkoxyamine” is construed as any molecule containing an alkoxy functional group bonded to an amine functional group having a solubility in aqueous phase.

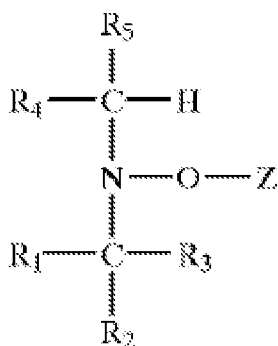
Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

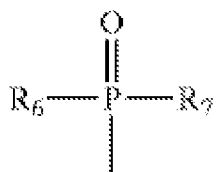
9. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Callais et al.* (US 2003/0149205).

Callais et al. discloses a process for controlled radical polymerization of acrylic and related polymers (Abstract), by using a controlled free radical initiator of N,N-dialkyl-alkoxyamines (p. 1, [0008]). The following is a general structure:



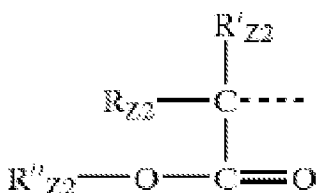
(pg. 2, [0019]),

where R_1 , R_2 , R_3 , and R_4 are straight chain or branched chain alkyl groups of 1 to 50 carbon atoms (p. 2, [0020]), R_5 is the following:



(pg. 3, [0035]),

such that R₆ and R₇ are straight chain alkoxy groups (p. 3, [0036]), and Z is the following:



, (pg. 3, [0026]),

Where, R_{Z2}, R'_{Z2} are straight chain or branched chain alkyl groups of 1 to 50 carbon atoms and R''_{Z2} is hydrogen (p. 3, [0027]).

Callais et al. does not mention the solubility of the acidic form or salt of the alkoxyamine of the instant invention of formula (I). The acidic form of the applicant's formula (I), above, is shown to be water-soluble, as evidenced by Scheme 1 of the following article: Charleux et al. *Angewandte Chemie International Edition*. 2004. **43**, 45. 6186-6189.

Callais et al. does not teach the salt of Z, nor the use of the alkoxyamine in an emulsion; however, the sodium salt of the carboxylate type radical of group Z is an obvious variant of the radical itself, which can be easily obtained to one skilled in the art by reacting the alkoxyamine with a hydroxide, such as sodium hydroxide or ammonium hydroxide.

Callais et al. further notes that the above Z group is liberated from the alkoxyamine upon heating, which forms an initiating free radical and a stable free radical, the nitroxyl (p. 2, [0024]). If the Z group was liberated as a free radical salt, it could act as both the initiating agent and emulsifying agent, as is believed by the applicant of the alkoxyamine of formula (I) (page 3 of the instant application).

Therefore, it would have been obvious to one of ordinary skill in the art to have modified the alkoxyamine of *Callais et al.* into a salt to use as a primary component in a controlled polymerization as part of an emulsion.

10. Claims 11-28 rejected under 35 U.S.C. 103(a) as being unpatentable over *Charleux et al.* (US 6,353,065), in view of *Callais et al.* (US 2003/0149205).

Charleux et al. teaches a process for emulsion polymerization in the presence of a stable free radical resulting in a latex solution of polymer particles through controlled polymerization (col. 1, ll. 11-20). The stable free radical is that of a nitroxide radical, which can be cyclic or acyclic, and can have a phosphoryl group in the β -position with respect to the nitrogen of the nitroxide radical (col. 3, l. 56 – col. 4, l. 41).

Charleux et al. also teaches that the stable free radical can be introduced into the polymerization medium in the form of a stable free radical or in the form of a molecule comprising a group capable of generating a stable free radical during the polymerization, such that the group generating the stable free radical is a polymerization initiator and an emulsifying agent itself (col. 6, ll. 3-21). The

emulsifying agent exhibits a carbon containing chain, preferably of at least 5 carbon atoms, in the presence of a stable free radical and a free radical initiator, such as organic peroxides and hydroperoxides, to pull a hydrogen off from the hydrocarbon chain (col. 6, ll. 21-49).

The stable free radical is preferably introduced into the polymerization medium at least partially bonded to an emulsifying agent (col. 6, ll. 50-53). The emulsifying agent is a surfactant making it possible to stabilize the emulsion, and can be any standard emulsifying agent including those that are cationic, anionic, nonionic, amphoteric, quaternary or fluorinated (col. 6, ll. 62-67). One emulsifying agent mentioned is that of sodium stearate, an 18 carbon carboxylate.

Note the suggestion by *Charleux et al.* that a bond forms between the nitroxyl and a carboxylate. Chemically, this bond would form between the α -carbon of the carboxylate and the nitroxide radical. The hydrogen bonded to the α -carbon of a carboxylate is the most acidic of the carbon chain and therefore most easily removed; therefore, as suggested by *Charleux et al.*, the free radical initiator would remove a hydrogen from the α -carbon allowing for a bond to form between the carboxylate and nitroxyl, resulting in the same chemical bonding as formula (I) of the instant invention.

Charleux et al. does not specifically teach the structure of the applicant's alkoxyamine of formula (I); however, *Callais et al.* teaches an obvious variant of formula (I), as shown above.

Therefore, with consideration to the above chemical analysis as taught by *Charleux et al.* and the molecule taught by *Callais et al.*, it would have been obvious to one of ordinary skill in the art to have modified the alkoxyamine of *Charleux et al.* with that of *Callais et al.* in order to meet the properties and role of the applicant's alkoxyamine of formula (I).

Further, in order to meet the solubility requirements of the instant application, one of ordinary skill in the art would know that as an alkyl chain of a molecule is shortened, the molecule becomes more water-soluble.

Therefore, it would have been obvious to one of ordinary skill in the art to have further modified the alkoxyamine of *Charleux et al.* by replacing the sodium stearate with an emulsifying agent with shorter alkyl groups in order to increase the solubility of the alkoxyamine, which would further meet the properties of the applicant's alkoxyamine of formula (I).

As to claims 16-17, *Charleux et al.* teaches the addition of 0.686 g of an alkoxyamine and 17.5 g of a monomer in Example 10 (col. 16, ll. 46 and 51), which is approximately 4% of alkoxyamine by weight of one monomer.

As to claims 18-19, *Charleux et al.* teaches monomers and combinations of monomers with the following functionalities: vinyls, such as methacrylates and vinylaromatics; vinylidenes, such as vinylidene fluoride; dienes, such as butadiene and isoprene; olefinic monomers, such as ethylene and butane; and allylic monomers (col. 7, l. 56 – col. 8, l. 62).

As to claims 20 and 21, *Charleux et al.* teaches an emulsion carried out with stirring of an aqueous phase of water, the initiator and emulsifying agent (carrying a group generating the stable free radical), and an organic phase of the monomer, an optional solvent, and an optional cosolvent (col. 10, l. 64 - col. 11, l. 8). The cosolvent is further defined as a liquid at the polymerization temperature, exhibiting a solubility in water at 25°C of less than 1×10^{-6} g/L (col. 7, ll. 37-40). The process is carried out at a temperature ranging from 50 to 140°C, and at a pressure sufficient to prevent the phases of the emulsion from boiling and sufficient for its various constituents to remain essentially in the emulsion (col. 11, ll. 9-17). The shearing is sufficient for producing the miniemulsion state and can be obtained by ultrasound (col. 7, ll. 50-52)

As to claim 22, *Charleux et al.* teaches a process for the preparation of multiblock polymers, such that a first block is prepared. When the first monomer is consumed by the reaction, a second monomer intended for the second block is added to the polymerization without stopping the stirring and without cooling or other interruption. A third block can be added in the same way as the second (col. 9, ll. 8-41).

As to claims 23-28, *Charleux et al.* teaches that the emulsion process results in a polymer latex of polymer particles with a mean diameter of less than 2 μm and generally between 20 and 1000 nm (col. 11, ll. 22-25). The particles can be block polymers and more specifically those including the following: polystyrene-b-poly(methyl methacrylate), polystyrene-b-polystyrenesulphonate,

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polystyrene-b-polyacrylamide, polystyrene-b-polymethacrylamide, etc. (col. 11, ll. 32-37 and col. 9, l. 42 – col. 10, l. 9).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIEANN R. FINK whose telephone number is (571)270-7344. The examiner can normally be reached on Monday through Friday, 7:00 AM to 4:30 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner
Art Unit 4131

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Examiner, Art Unit 4131